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ULTRASOUND FLAW DETECTOR BASED ON A MOBILE PHONE

The task of creating a portable device is solved in this paper. This device uses an ultrasonic method for defect detection and has a convenient and more efficient system for transmitting and processing informa-tion in comparison with the previously developed one.

The cable is usually used for communication between the converters and the processing unit.

In cases where they are located far from each other, wireless data transfer is necessary Wireless data transfer allows for the automation of the system and frees us from the physical connection of two or more parts of the device. The use of wireless communication for technical diagnostics with known methods of NDT is considered in the paper [1].

The results of using wi-reless technology in NDT tasks for data transmission over short distances are presented in the papers. [2, 3, 4]. The generated model of the eddy current flaw detector uses Bluetooth [2] and Wi-Fi technology [3]. The application of GSM technology is considered in [4, 5]. It considerably increases the transmission distance of the data obtained.

Mobile devices (smartphones, tablets, etc.) with powerful computing capabilities and touch screens have become widespread in our time. It was set the task of developing a defectoscope using a mobile device as a block of processing the results of control in this work.

Let's consider the structural scheme of the created ultrasonic flaw detector with wireless data transmission (Fig. 1). The converter unit can be divided into two parts: analog (1) and digital (2). An analog incorporates a shock excitation generator, represents as a piezoelectric converter (PCT), which is fed through the key (K) by the reference voltage (RV). The generator frequency is set by a short pulse supplied from the control unit (CU). The generated impulse propagates in the testing object (IO). It is

reflected and re-enters the PEC after reaching the bottom surface or defect. The resulting echo pulse has a small amplitude, so before digitizing it

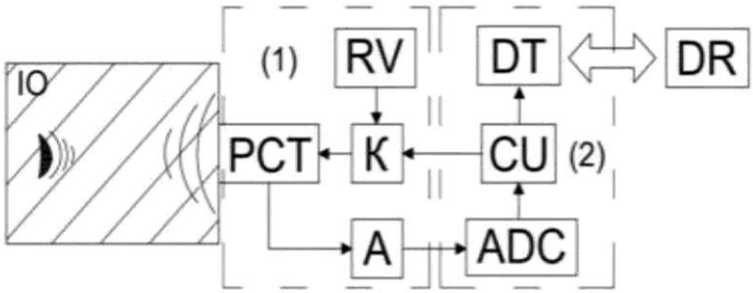

Figure 1. Structural diagram of ultrasonic defectoscope

IO - Investigated object, RV - reference voltage, K - key, PCT - Piezo ceramic transducer, A - amplifier, ADC - analog-digital converter, CU control unit, DT - Data transmitter, DR - Data receiver.

must be amplify (A). The main task of the digital part (2) is to convert an analog signal to a digital one (ADC) and to transmit it to the information processing unit (DR) through the information transfer unit (DT).

A model of a mobile ultrasonic flaw detector was created based on this scheme.

Conclusions. The portable ultrasonic flaw detector discussed in this article has several advantages over existing devices. The investigation is based on an ultrasonic method for defect detection, which makes the control process not only safe, but also sufficiently precise for unambiguously establishing the state of the research object. Thanks to the analysis of modern electronic elements, energy consumption was minimized, which in turn increased the device's operating time, with the same power source parameters. The use of wireless data transmission technology allows the use of global networks to manage the operations of monitoring the state of various objects, including objects with increased danger. Additionally, the ability to use the radio waves for information transmission allows the use of more advanced data processing systems at considerable distances from the IO.

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